



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/51

Paper 5 Practical Test

May/June 2012

CONFIDENTIAL INSTRUCTIONS

Great care should be taken to ensure that any confidential information given does not reach the candidates either directly or indirectly.

The Supervisor's attention is drawn to the form on page 8 which must be completed and returned with the scripts.

If you have any queries regarding these instructions, please contact CIE

by e-mail: International@cie.org.uk

by phone: +44 1223 553554

by fax: +44 1223 553558

stating the nature of the query and the syllabus number quoted above.

This document consists of **6** printed pages and **2** blank pages.



Instructions for preparing apparatus

These instructions detail the apparatus, reagents and specimens required by each candidate for each experiment in this paper. A summary of the questions that will be presented to the candidates is included, where appropriate, to allow the teacher to test the apparatus appropriately. **No access is permitted to the question paper in advance of the examination session.**

It is assumed that the ordinary apparatus of a science laboratory will be available, including a supply of purified water (distilled or deionised).

If arrangements are made for different sessions for different groups of candidates, care must be taken to ensure that the different groups of candidates are effectively isolated so that **no information passes between them.**

All specimens should carry only the code letters and numbers as indicated and their identity should not be revealed to the candidates.

Supervisors should ensure that all specimens have the correct identity attached to the specimen and that these are **not** removed during the examination.

If a candidate breaks any of the apparatus, or loses any of the material supplied, the matter should be rectified and a note made in the Supervisor's Report.

Supervisors are advised to remind candidates that **all** substances in the examination should be treated with caution. Only those tests described in the Question Paper should be attempted. Pipette fillers and safety goggles should be used where necessary.

In accordance with COSHH (Control of Substances Hazardous to Health) Regulations, operative in the UK, a hazard appraisal of the examination has been carried out.

The following codes are used where relevant

C = corrosive substance

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to the environment

The attention of Centres is drawn to any local regulations relating to safety, first-aid and disposal of chemicals.

'Hazard Data Sheets', relating to materials used in this examination, should be available from your chemical supplier.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

Centres are reminded that they are **not** permitted to open the question paper envelopes before the examination. Centres are also referred to the Handbook for Centres, and in particular Section 3.1.2(c)(i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

If there are difficulties with any aspect of setting up this practical examination that the Centre is not able to resolve, it is essential, for Centres to contact the Product Manager as soon as possible by e-mail to international@cie.org.uk, by phone to +44 1223 553554 or by fax to +44 1223 553558.

For Question 1

Each candidate will require:

- (i) 2 large, hard glass, test-tubes (size 150 x 25 mm) labelled with a permanent marker pen **A** and **B**
- (ii) Bunsen burner, means of lighting it, and a tripod and gauze
- (iii) tweezers (forceps)
- (iv) iodine solution, labelled **iodine**, and a dropping pipette
- (v) 250 cm³ beaker for water bath
- (vi) 2 petri dishes placed on white card (or white tiles) labelled **A** and **B**

[F][H] (vii) 30 cm³ alcohol (ethanol) labelled **alcohol**

- (viii) a leaf, labelled **A**, from a plant* that has been exposed to bright light for 2 days in order to encourage photosynthesis
- (ix) a leaf, labelled **B**, from a plant that has been kept in the dark for 3 days, which must be the same type of plant as **A**
- (x) a beaker for waste, labelled **waste**
- (xi) wash bottle containing distilled (or deionised) water for rinsing
- (xii) glass rod
- (xiii) paper towels to mop up spills
- (xiv) a stopclock or timer with a seconds hand.

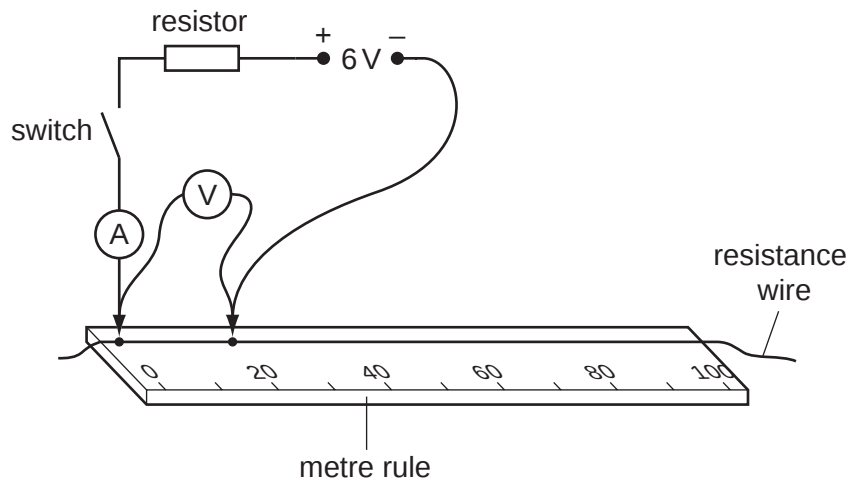
* The plant used should be a dicotyledonous plant. It must not have thick leaves or a thick cuticle. Suggested plants are: geranium, Pelargonium, nasturtium, busy lizzie, Tradescantia.

Note: The leaves used should readily lose their colour after 15 seconds in boiling water followed by 5 minutes in hot alcohol.

For Question 2

Each candidate will require:

- (i) 1.1 m of constantan 34 SWG resistance wire (approximately $11.4\ \Omega/\text{m}$ but not greater than $15\ \Omega/\text{m}$)
- (ii) metre rule with the wire attached. The wire should be attached with tape at the 10.0 cm and 90.0 cm marks. About 5.0 cm of wire should extend at either end of the rule as shown
- (iii) 2 crocodile clips capable of easy connection to 4 mm plugs
- (iv) power supply to provide 6 volts DC
- (v) switch
- (vi) $10\ \Omega$ resistor attached to 4 mm sockets or with crocodile clips. The resistor must be mounted so that it is attached to 4 mm terminals or have sufficient length of connecting wires to be attached by crocodile clips
- (vii) ammeter measuring up to 1 A
- (viii) voltmeter measuring up to 5 V
- (ix) sufficient wires with 4 mm plugs at each end to enable the following circuit to be constructed.



For Question 3

Each candidate will require:

- (i) 4 g of a homogeneous mixture of equal masses of copper carbonate and sodium chloride solids labelled **A**
- (ii) 100 cm³ beaker
- (iii) 50 cm³ measuring cylinder
- (iv) stirring rod
- (v) filter funnel and filter paper
- (vi) spatula
- [H] (vii) access to dilute hydrochloric acid, about 20 cm³ of about 2 mol dm⁻³, labelled **hydrochloric acid**
- (viii) 3 test-tubes, (size 125 x 15 mm)
- (ix) 1 large test-tube, (size 150 x 25 mm) and means of supporting it
- (x) test-tube rack
- [H] (xi) access to aqueous sodium hydroxide, about 15 cm³ of about 0.4 mol dm⁻³, labelled **sodium hydroxide**
- [N][H] (xii) access to aqueous silver nitrate, about 0.05 mol dm⁻³, labelled **silver nitrate**
- (xiii) access to aqueous barium chloride, about 0.1 mol dm⁻³, labelled **barium chloride**
- (xiv) test pipettes or droppers and the means to wash them out
- (xv) white tile
- (xvi) wash bottle containing distilled (or deionised) water.

Spare materials and equipment should be available and can be provided without penalty. **Candidates should be made aware of this.**

Information required from the Supervisor:

The Supervisor is asked to carry out the experiments and to enter the results on a spare copy of the examination paper, clearly marked 'Supervisor's Results' and showing the Centre number. This should be done, out of sight of the candidates, using the same solutions, reagents, specimens and apparatus as the candidates.

A copy of the 'Supervisor's Results' should be returned with each packet of scripts. Failure to do so may cause the candidates to be penalised.

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This form must be completed and returned in the envelope with the scripts together with the seating plan and the Supervisor's Results as mentioned on page 5.

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General

The Supervisor is invited to give details of any difficulties experienced by particular candidates giving their names and candidate numbers. These should include reference to:

- (a) difficulties due to faulty apparatus;
- (b) accidents to apparatus or materials;
- (c) physical handicaps, e.g. short sight, colour blindness;
- (d) any other information that is likely to assist the Examiner, especially if this cannot be discovered in the scripts;
- (e) any help given to a candidate.

The Supervisor is asked to supply the following information:

Plan of work benches, giving details by candidate numbers of the places occupied by the candidates for each session and a copy of the 'Supervisor's Results'.

NAME OF CENTRE

SIGNED
Supervisor

CENTRE NUMBER

DECLARATION (to be signed by the Principal)

The preparation of this practical examination has been carried out so as to maintain fully the security of the examination.

NAME
(in block capitals)

SIGNED (Principal)



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